Highlights of the Quarterly Meeting - Final Minutes

INTERAGENCY COMMITTEE ON INDOOR AIR QUALITY (CIAQ)
Wednesday, January 23, 2002

Introduction , given by Mary T. Smith, Director, IED. Members and guests introduced themselves.

Updates by Member Agencies

EPA/Consumer Labeling Review Update - John Alter

The Consumer labeling initiative is trying to avoid accidental poisoning. We encourage consumers to read labels on households products particularly pesticides, insecticides, and household cleaners. We have mounted an outreach campaign to spread the message of "Read the Label First!" We have outreach and promotional materials. We go to conferences, conventions, etc. like American Public Health Association, National Safety Council, etc. The most recent thing of note is that we have entered into a cooperative agreement with the National Safety Council because we found that our goals and their goals converged on community and home safety. They are expanding from their traditional occupational safety and traffic safety campaigns to home and community safety. It was a natural connection so they will be using some of our materials and developing some new materials like media kits and so forth and using their national networks and youth outreach networks to get our message out. We are pleased to be working with them on a two year cooperative agreement. We are just getting started on the agreement.

HUD/Lead Update - Ellen Taylor

We are preparing the funding ability for the next round. We are using most of the model that we have used in previous years. The timing should be similar to previous years in terms of release. HUD is generally in the last few years published its super notes from the federal register at the end of February. EPA, HUD, and the Department of Justice are working together in terms of enforcement of the Lead Disclosure Rule, which is the fact that in real estate transactions such as rental of an apartment, sale of a house, renovation jobs, and/or rehabilitation jobs may disturb lead paint. The owners, landlords, or contractors have to give a copy of the EPA pamphlet or equivalent information. As you can tell compliance with that regulation is not 100%. There has been major enforcement actions that have been generally taken and just completed in DC, the west coast, and Chicago. Details about the enforcement can be found on our website and probably EPA's website, including several hundred thousand dollars worth of fines. More importantly part of the settlement agreement there will be a lot of units made lead safe and also contributions made to child health improvement programs, which can mean there may be funding for medical center, health care education center. Lastly, Mold and Moisture training with the Mid-Atlantic Center, February 4-5, 2002. The 32 slots are filled and there is a waiting list.

DOE/Update - John Talbott

DOE ASHRAE Activities. In December, ASHRAE SPC 62.2P which is responsible for developing ASHRAE's residential ventilation standard, voted on responses to all comments from the 2nd public review (approx 400 comments from 130 commenters). A few minor changes—mostly, but not exclusively editorial—were made to the draft standard. The SPC recommended a third public review to the ASHRAE Standards Committee. We are anticipating public review during for the spring with comments to be reviewed in at the next ASHRAE meeting Honolulu, during June 2002. At the Atlantic City meeting, potential addenda were discussed. It was also decided that both a guideline and a users manual should be written for 62.2P. The SPC is going to initiate the guideline activity. Users Manuals are normally written by ASHRAE SPCs.

The ASHRAE IAQ 2001 Conference was held in San Francisco during November, with a focus on moisture and microbes in buildings. The conference was sold out, with 254 registrants, and received a high rating from attendees (8.04 on a 10 point scale). DOE-supported researchers at LBNL and NIST helped to organize the conference.

Lawrence Berkeley National Laboratory Activities. LBNL, in collaboration with U.C. Berkeley, has completed a

paper on a study of the relationship of ventilation rates in a call center with worker productivity. This study is one of a very few on the relationship of IAQ with the work performance of actual office workers. An abstract follows:

ABSTRACT

We investigated the relationship of ventilation rates with the performance of advice nurses working in a call center. Ventilation rates were manipulated, temperatures, humidities, and CO2 concentrations were monitored, and worker performance data, with 30-minute resolution, were collected. Multi-variate linear regressions were employed to investigate the association of performance with building ventilation rate, or with indoor CO2 concentration (which is related to ventilation rate per worker). Results suggest that the effect of ventilation rate on worker performance in this call center was very small (probably less than 1%) or nil, over most of the range of ventilation rate (roughly 12 L s-1 to 48 L s-1 per person). However, there is some evidence of performance improvements of 2% or more when the ventilation rate per person is very high, as indicated by indoor CO2 concentrations exceeding outdoor concentrations by less than 75 ppm.

LBNL has completed a set of 18 experiments to study whether supplying outside air at very low velocity near a seated worker's torso (a form of task ventilation) can substantially increase the effective ventilation rate at the breathing zone, relative to conventional air supply systems which usually provide nearly uniform ventilation throughout rooms. In experiments with a thermal mannequin, the measured values of air change effectiveness have been as high as 2.2, signifying more than a doubling of effective ventilation rate at the breathing zone relative to a conventional ventilation system supplying the same quantity of outside air. The measured values of air change effectiveness with this air supply system substantially exceed those of displacement ventilation systems and of commercially available task ventilation systems.

A group of scientists from LBNL, UC Berkeley, and The California Department of Health Services are organizing the Indoor Air 2002 Conference to be held in Monterey, California, June 30 – July 5, 2002. This conference was last held in the United States during 1981. More than 1000 abstracts were submitted and the organizers expect to accept 700 to 800 papers. The anticipated attendance is 1200 to 1500. Papers are due at the end of January. For more information see www.indoorair2002.org

In a project funded jointly by DOE and the Association of State Energy Research and Technology Transfer Institutions (ASERTTI), a team of scientists and building professionals met for three days in Berkeley during early January to define high priority energy-related IEQ research needs. The team identified ten broad research goals and approximately four priority research areas related to each goal. Through a voting process, the 35 highest priorities and the 20 highest priorities were also identified. Approximately half of the priority projects areas focus on development of new knowledge and the other half focus on implementation of current knowledge. The next major step will be to seek input from an industry/stakeholder advisory team.

The Indoor Health and Productivity (IHP) Project is supported by DOE, EPA, and Southern California Edison. In one current activity, the project has assembled a team of expert reviewers from around the world who selected five recent key papers in the IHP field with practical knowledge for building professionals. Summary articles were written based on each paper. These summary articles will be published during 2002 in five sequential issues of ASHRAE Journal. Another current IHP activity, supported by EPA, has been to perform a critical review of the state of knowledge on the relationship of IEQ in schools to the performance of students and teachers. The draft paper is undergoing review by a project review committee. In a third activity, the IHP project has assembled a bibliography of approximately 900 IHP papers. The bibliography is accessible via the IHP web site www.ihpcentral.org.

NIST/ASHRAE Update - Andy Persily/Cindy Reed

ASHRAE STANDARD 62: The standard was just republished as 62-2001. The most important changes are the addition of two new sections: one on Commissioning and System Startup and another on Operations and

Maintenance. This should remove all questions of whether 62 is just a design standard. The new standard is available from ASHRAE. If you have questions on the ongoing revision effort, contact Andy Persily at 301 975-6418 or andyp@nist.gov.

ASHRAE 62.2. SPC 62.2P, the committee responsible for writing the new ASHRAE Standard 62.2 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. The committee met in December and January to address the 2nd Public Review comments. Based on the comments, the proposed standard was revised and the committee approved the changes for public review as independent substantive changes. An ISC public review essentially limits comments to those portions of the proposed standard that have changed since the previous public review. Removal of requirements for automatic door closers on doors to attached garages and for bathroom fans to be quiet were among the technical changes. For more info, contact Steven Emmerich at 301-975-6459 or steven.emmerich@nist.gov.

NIST/UPDATE - Cindy Reed

HUD HHI: NIST is continuing a number of projects under the HUD Healthy Homes Initiative.
They include:

- The identification and definition of a set of residential buildings that represent the US residential housing stock. These buildings will be entered into the CONTAM IAQ model for use in conducting nationwide analyses of exposure or impacts of various IAQ control strategies.
- Modeling of selected indoor contaminant sources and their control, focusing on moisture, cooking and other activities.
- Development of database of IAQ modelling inputs including source strengths, deposition rates, filter efficiencies.
- Study of airflow and contaminant transport from attached garages into single-family residences.

NEW NIST TEST HOUSE: NIST has just installed a new double-wide manufactured test house for ventilation and IAQ research on the NIST campus. Will be using it to conduct studies of mechanical ventilation, air cleaning, VOC emissions from building materials, and residential moisture issues.

Access Board/Update - Jim Raggio

We are the Access Board, The Architectural and Transportation Barriers Compliance Board. We are currently working on an IAQ project. We develop accessability guidelines for the American with Disabilities Act and the Architectural Barriers Act. The reason we got into the area of indoor environmental quality is because there is a constituency among people with disabilities who are concerned about indoor air quality issues. A lot of this constituency are people who have multiple chemical sensitivities, environmental sensitivities but it also includes people with other conditions in terms of asthma and allergies. They have been beseeching us for almost a decade to do something. We are a very small agency and this is really beyond our resources and expertise. None the less, we have made a commitment to this constituency to make some effort in this area in working with other organizations. Basically our agency committed an amount of money from our research budget, which is very small, to try and get an IAQ project started.

The basic idea of the project is to build on the work that the EPA has done with their *Healthy Buildings, Healthy People* Report in terms of where they start to develop a strategic plan that identified a number of objectives and strategies for the goal of healthy buildings which our constituency identify with. There is a lot of overlap between issues of the constituency group that we deal with and what is in that report. Again, we want to build on that report and take the next step. We want to focus on building design and construction in a commercial field, not residential. We have a long history of working with people in the building design and construction industry. We have had success working with them through regulatory and non-regulatory means in addressing lots of complicated issues. We want to bring together stakeholders in the building and building materials industry to take the next step in the strategic plan.

We want to take a collaborative approach to add substance and further develop the strategies that you have and try to get some implementation plans in terms of looking three to five years out. Our agency committed $100,000 to try and get this project started. In October we send out a request for proposals. We received three bids from companies who do inspection and litigation work for federal agencies. They really were clueless in terms of what we were asking for and they didn't have the background we were looking for. The bids were also in the $200k - $400k range.

The key to doing this project is getting the right people together and probably going through the contracting process is not the best way to do this. We would like to partner with some other agencies and organizations who have some resources and who might be interested in contributing to this effort. One of the more promising contacts I have made is The National Institute of Building Sciences here in D.C. We have worked with them before on other projects. They are a Congressionally chartered organization and are very interested. In terms of getting the right people together, they would be good to work with. I have also contacted Jim Riesa who heads one of the biology and research group at the National Research Council. They are kind of interested although he said this is a $500k project and wants to re-write the entire thing. Jim was turned off by the fact that they couldn't take control of the project. Jim wanted to change the purpose of the project. Our front candidate to start moving forward on this project is NIBS. They would get the right people together and advance this cause. We think they are the best group to make this happen. We would appreciate to hear from anyone else here. We would like to partner with folks and we do have some room to change the project a little while still saying true to the constituency group. We need some partners and would like to talk to you if you are interested

EPA/IED Update: Mary Smith

We have a lot going on but I'm going to focus on a few things that are hot and interesting. We are starting to get involved in emergency response issues because obviously there are building issues. As someone mentioned earlier, we just finished cleaning up the Hart building which has been opened. I know that several other members on CIAQ are starting to get involved in that issue also and you have been contacted by the Home and Security people and have gone to one meeting and will probably be going to more. The focus right now is preparedness. How do you make a building "safer" and more prepared for events.

We are looking to put out in the next month a small mold document designed for residences. We are looking later on to put out a larger more detailed one for residences. We think there is a great interest in mold in homes.

Healthy Buildings, Healthy People is back from the printers and I'm just looking to finalize a letter and then we will be getting that out soon. We will make sure everyone in CIAQ will get a copy.

This year we are conducting several surveys. One we are conducting right now is a survey of large buildings and their operation/maintenance practices with regard to IAQ. We are working with BOMA to get that done. We are hoping to have results back soon and analyzed. We have O&B approval to do a school survey which isn't out yet but we are hoping to get that out in the next several months. The school survey will look at a random sample of schools and ask them about their operation and maintenance practices. There will be interesting data coming out of that survey. We are awaiting O&B approval on a phone survey of people to ask them questions about asthma and how much action they take to look at their indoor air triggers of asthma and how many people are smoking outside in regards to their small children.

Next CIAQ Meeting: Wednesday, April 24th, 2002 at 501 3rd St., from 1:00 to 3:30 pm.

PRESENTATION

Indoor Health and Productivity (IHP)

Satish Kumar (LBNL)*

A series of slides were shown. A short summary of the slides follows:

Components of Sustainable Construction

Site Selection and Preparation
Resource Conservation
Energy Conservation
Water Conservation
"Green" Materials
Waste Reduction
Indoor Environmental Quality

Why is IEQ Important?

Effects on people
- Health
- Perceptions (comfort, satisfaction)
- Productivity

Effects on materials and equipment
- Soiling of surfaces
- Corrosion
- Linkage to building energy use

ECMs Impact on IEQ and Energy Use

Changes to Building Design, Operation, Maintenance = Energy Savings or Increased Energy Use
Improved Indoor Environmental Conditions = Increased Worker Performance
Improved Health and Satisfaction = Reduced Health Care Costs = Economic Benefits

Changing Ventilation Standards: History & Philosophy

1865-1905	Infection Control	12-14 L/s per person
1936	Comfort (odor)	5-7 L/s per person
62-81	ASHRAE	2-12 L/s per person
62-89	ASHRAE	7-28 L/s per person
62-99	ASHRAE	8-30 L/s per person

About the Project

***See the list of CIAQ Attendees at the end for contact information.**

Motivation

Lack of credible and reliable information
Wide gulf between research and practice
Interpretation and generalization of a research project is a problem
- Controlled experiment
- Confounding variable
- Lab vs. field setting
- Underlying assumptions and limitations

Policy issues, research questions, practical implications (standards, guidelines, best practices)

Objectives

Research and Policy Analysis
- Critical reviews of existing IHP literature
- Publication of summary articles in journals
- Help formulate an IHP research agenda

Public Education and Information Dissemination
- Online bibliographic database of IHP literature
- Highlight important research findings (both new and old)
- Answer frequently asked questions on the topic of IHP

Sponsors

Subcommittee on Construction and Building (C&B)
- Department of Energy
- Environmental Protection Agency
- National Institute of Standards & Technology (NIST)

Southern California Edison
California Energy Commission
Potential Sponsors
- National Institute of Health
- General Services Administration
- State Energy Organizations
- Private organizations interested in IHP related issues.

Partners

Current partners
- National Research Council
- University of California
- Carnegie Mellon University
- Harvard School of Public Health

Potential partners in a broader collection
- Office Productivity Network
- International Facility Managers Association
- National Research Council of Canada
- Danish Building and Urban Research
- Lighting Research Office
- Lighting Research Council

Current IHP Project
Topic: Selection of Five Research Papers in the field of Indoor Health and Productivity; Publication of an overview paper and summary articles in ASHRAE Journal
Sponsor: Southern CA Edison
Intended Audience: Architects, HVAC Engineers, and Facility Managers

Impact of Daylighting on Students Learning
Study: 21,000 students, 2,000 classrooms in three school districts
Focus: Impact of day-lighting in classrooms on students' learning
Conclusions: Day-lighting helps improve standardized test scores of students by 15-26% in one school district
Major implications: Design of adequately dimensioned and positioned windows and skylights
Other implications: Test scores are driving school budget decisions; the study provides a compelling case for daylit classrooms to improve students' learning process.

Health Benefits From Higher Ventilation Rate
Study based on 3,720 employees in 40 buildings
Sick leave data of office workers - metric to evaluate IEQ
Association between ventilation rate, humidification and short-term sick leave
1.2 to 1.9 days of increased sick leave per person per year, depending on age and gender in spaces with lower ventilation rate

Ventilation Rates and SBS Symptoms Results of a Critical Review
With Lower Vent. Rates
20 of 27 studies found statistically significant increase in symptoms
9 studies found >80% increase in prevalence of at least one symptom

Potential Benefits of 5 L/s per person 1 increase
Most common SBS symptoms 2 decreased by ~40%
Roughly $20 billion in associated productivity gains

Limitations and Future Research
Probabilistic models depend on several assumptions making generalizations difficult
Studies performed on "problem" building; results may not be valid for "average" building
Modeling of all risk factors in the analysis; Isolation of confounding variables
Increased Ventilation Rate Vs. Increased Filtration Vs. Ultraviolet Germicidal Irradiation
Very limited understanding of the health and productivity implications of indoor environment
More research needed to gather compelling evidence of associations/correlations

Main Contributions
Pooled resources to conduct meaningful research
Developed a framework for international collaboration
Created new value
Developed a process for volunteer work
Consolidated previous fragmented efforts

Proposed Future Tasks
- Role of ESCOs in improving IEQ in existing buildings
  How would IHP benefits be measured or verified?

What factors may confound quantification of benefits; How to deal with probabilistic nature of IHP benefits
Nature of contracts between ESCOs and their clients

- Assess the relationship of sick leave among grade 1-6 students by analyzing existing data collected by WSU
  Perform multi-variate statistical analyses of data
  Help guide the selection of minimum ventilation rates in classrooms

Conclusions

Improvements in indoor environments

- Opportunity to reduce
  Respiratory illness
  Allergy and asthma symptoms
  SBS symptoms
- Enhance quality and add value
- Financial benefits ~ tens of billions per year
- Enhance value and quality
- Need to identify and promote energy-efficient solutions

CIAQ Attendees: Wednesday, 23 January 2002

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